

## **REMARKS**

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-39 are presently active in this case. All claims and their respective status are shown above for the Examiner's convenience.

In the outstanding Office Action, claims 1, 3, 4, 8, 12, 13, 14, 16, 17, 21, 25-27, 29, 30, 34, 38 and 39 were rejected under 35 U.S.C. §103(a) as unpatentable over Applicants' admitted prior art (APA) in view of Kalliojarvi (WO 98/19488, hereinafter "Kalliojarvi"). Claims 2, 15 and 28 were rejected under 35 U.S.C. §103(a) as unpatentable over APA in view of Kalliojarvi as applied to claims 1, 14 and 27 and further in view of Fujii (EP 0 531 090 A2, hereinafter "Fujii"). Claims 5, 10, 18, 23, 31 and 36 were rejected under 35 U.S.C. §103(a) as unpatentable over APA in view of Kalliojarvi as applied to claims 1, 14 and 27 in further view of Examiner's Official Notice. Claims 6, 7, 19, 20, 32 and 33 were rejected under 35 U.S.C. §103(a) as unpatentable over APA in view of Kalliojarvi as applied to claims 1, 5, 14, 18, 27 and 31 above and further in view of Examiner's Official Notice and further in view of Searle (U.S. 4,743,871, hereinafter "Searle"). Claims 9, 22 and 35 were rejected under 35 U.S.C. §103(a) as unpatentable over the above references used in claims 1, 5, 6, 14, 18, 19, 27, 31 and 32 above and further in view of Gorbert (U.S. 5,317,322, hereinafter "Gorbert").

Applicants acknowledge with appreciation the indication of allowable subject matter. Claims 11, 24 and 37 were objected to as dependent upon a rejected base claim but were indicated to be allowable if rewritten in independent form including all limitations of the base claim and any intervening claims. However, Applicants will maintain claims 11, 24 and 37 in dependent form at the present time since Applicants believe that the independent Claims that 11, 24 and 37 depend from define patentable subject matter.

In response to all the rejections under 35 U.S.C. §103(a), Applicants respectfully request reconsideration of these rejections and traverse the rejections as discussed next.

An exemplary embodiment of the present invention relates to a microcell base station utilizing a two-dimensional (2D) antenna array, which is co-located with the macrocell antenna. The two-dimensional antenna array is steerable in both horizontal and vertical directions. The size of the microcell coverage area depends upon the distance from the cell site antenna as well as the dimensionality of the array, which determines the angular spread of the beam.<sup>1</sup>

Thus, an exemplary embodiment of Applicants' invention, therefore, improves upon the conventional system of creating microcells within macrocells, as illustrated in Figure 2, where two microcells 40 are formed on the two hotspots 30. The macrocell 10 acts as the umbrella cell, which

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<sup>1</sup> See the present specification, for example, at page 3, lines 9-14.

requires installing multiple base stations 20 in each hotspot which is costly. The claimed invention thus leads to improved caution, efficiency and ability to cover hotspots that move over time.<sup>2</sup>

Turning now to the applied prior art, APA generally discloses localized micro/picocells may be established within overlying macrocells to handle traffic "hot spots." The Kalliojarvi patent discloses a method of locating the position of terminal equipment in a system in which one part of a subscriber connection is formed by a radio connection between the terminal equipment and a base station.<sup>3</sup> The Fujii patent relates to the structure of cells in a communication system which reduces the operational load of a base station and improves effect of re-use partition cells.<sup>4</sup>

The Office Action considers that the two types of radio cells and their respective antennas can be "co-located." However, the APA does not teach the antennas being on the same antenna tower. Applicants respectfully submit that co-located "may also be defined as on the same antenna tower regardless of distance separation."<sup>5</sup> Thus, even if APA were combined with Kalliojarvi, it would still not teach all the claimed limitations, namely that the antennas are located on the same tower as defined in the specification.

Applicants further traverse because the record fails to provide the required motivation to combine APA with Kalliojarvi. The Kalliojarvi patent

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<sup>2</sup> See the instant application, for example, at page 2, line 25 to page 3, line 2.

<sup>3</sup> See Kalliojarvi at page 1, lines 4-7.

<sup>4</sup> See Fujii, for example, at page 2, column 1, lines 1-3 and page 2, column 2, lines 29-32.

<sup>5</sup> See present specification at page 3, lines 17-20. An Applicant is entitled to be their own lexicographer so long as a word is explicitly defined in the specification. When an explicit definition is provided by the Applicant for a term, that definition will control the interpretation of the term as it is used in the claims. See M.P.E.P. §2106.

describes a method of locating the position of terminal equipment in a system in which one part of the subscriber connection is formed by a radio connection between the terminal equipment and the base station. Similarly, the Kalliojarvi patent states that its structure already achieves the goal of computational simplicity as the channel estimates are correlated, the number of required computational operations is reduced radically. Thus, record fails to provide the required evidence of a motivation for a person of ordinary skill in the art to modify Kalliojarvi with APA. Likewise there is no evidence of motivation in APA to modify it with Kalliojarvi. Thus, Applicants respectfully traverse the rejection of Claims 1, 3, 4, 8, 12, 13, 14, 16, 17, 21, 25-27, 29, 30 and 34 under 35 U.S.C. §103(a).

Next, turning to the obvious rejection of claims 2, 15 and 28 under APA and Kalliojarvi with Fujii. As noted in the Official Action, the Kalliojarvi patent, fails to teach or suggest Applicants' claimed at least one steerable N-dimensional array servicing the microcell is co-located on an antenna tower with the antenna serving the macrocell.<sup>6</sup> The Office Action attempts to remedy this deficiency by combining APA and Kalliojarvi with Fujii. Applicants traverse the combination of APA with Kalliojarvi as discussed above and further traverse the additional combination of Fujii as discussed below.

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<sup>6</sup> See the Official Action at page 5, last full paragraph.

The Applicants traverse the rejection because there is no sufficient evidence of record for the required motivation to modify APA and the Kalliojarvi patent by incorporating Fujii's cell re-use partition, for the following reasons.<sup>7</sup>

The outstanding Office Action states that the proposed modification would have been obvious "for one of ordinary skill in the art at the time the invention was made to have a microcell antenna co-located with a macrocell/base station antenna for the advantage of improving the effect of re-use partition cells (see col. 2, lines 32-32)."<sup>8</sup> The record, however, fails to provide the required evidence of a motivation for a person of ordinary skill in the art to perform such modification. While the Fujii patent may provide a reason for cell re-use partition in a mobile communication system, the Fujii patent fails to suggest why a person of ordinary skill in the art would be motivated to combine the cell re-use partition in a device such as the one disclosed in the Kalliojarvi patent.

The Kalliojarvi patent describes a method of locating the position of terminal equipment in a system in which one part of the subscriber connection is formed by a radio connection between the terminal equipment and the base station. On the other hand, the Fujii patent discloses that a first base station has a first beam tilt antenna having a tilt angle ( $\theta_{out}$ ) for the outer cell 30, and a

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<sup>7</sup> See MPEP 2143.01 stating "[o]bviousness can only be established by combining or modifying the teaching of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art," (citations omitted). See also MPEP 2144.08 III stating that "[e]xplicit findings on motivation or suggestion to select the claimed invention should also be articulated in order to support a 35 U.S.C. 103 ground of rejection. . . . Conclusory statements of similarity or motivation, without any articulated rational or evidentiary support, do not constitute sufficient factual findings."

<sup>8</sup> See the Office Action at page 6, first partial paragraph.

second beam tilt antenna having a tilt angle ( $\theta_{in}$ ) so that ( $\theta_{in}$ ) is larger than ( $\theta_{out}$ ). Thus, the  $\theta$  angles are used to track the directivity for the first small cell and the directivity for the second small cell.<sup>9</sup>

The Fujii patent does not suggest that the additional feature of an steerable N-dimensional array servicing the microcell which is co-located on an antenna tower with the antenna serving the macrocell is needed to achieve its intended goal. In fact, the Fujii patent does not suggest that a steerable N-dimensional array, such as the one disclosed in the Kalliojarvi patent, would be desired.

Similarly, the Kalliojarvi patent states that its structure already achieves the goal of computational simplicity as the channel estimates are correlated, the number of required computational operations is reduced radically.<sup>10</sup> The Kalliojarvi patent does not suggest that further improvement is desired, nor that another feature should be added to further improve its computational simplicity. Likewise, the Kalliojarvi patent does not suggest to add a co-located antenna tower with the antenna serving the macrocell, such as those disclosed in the Fujii patent.

The Kalliojarvi and Fujii patents themselves, nor the record, therefore, do not provide the motivation to perform the proposed modification of the Kalliojarvi system. Moreover, an attempt to bring in the isolated teachings of Fujii into the Kalliojarvi system would amount to improperly picking and choosing features from different references without regard to the teachings of

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<sup>9</sup> See the Fujii patent, for example, at Figure 5B.

<sup>10</sup> See the Kalliojarvi patent at page 4, lines 19-21.

the references as a whole. While the required evidence of motivation to combine need not come from the applied references themselves, the evidence must come from *somewhere* within the record. In this case, there is nothing in the record supporting the Office Action's proposed modification of APA and the Kalliojarvi patent.<sup>11</sup>

Furthermore, it is not clear from the record how the Fujii system could be incorporated into the Kalliojarvi system and APA. Under such a modification, the *tilt angles*  $\theta$ , as shown in Figure 5B, measuring directivity and distance between a base station and a mobile station, would be rendered obsolete.<sup>12</sup> Combining Fujii's cell re-use pattern with the steerable N-dimensional array of Kalliojarvi with APA would require a substantial reconstruction and redesign of the tilt angles  $\theta$  used to track the directivity and distance of the respective cells elements. Further, this would render obsolete the steerable N-dimensional array of the Kalliojarvi system, thus destroying its function. There is no evidence that a person of ordinary skill in the art would be motivated to perform such changes and redesign. Furthermore, it is not clear from the record how such a modification would actually achieve the advantage of improving the effect of re-use partition of cells as proclaimed in the Office Action.<sup>13</sup>

In rejecting a claim under 35 U.S.C. §103(a), the U.S. Patent and Trademark Office must support its rejection by "substantial evidence within the

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<sup>11</sup> The Official Action merely makes the overly broad statement that Fujii is in a "related field of endeavor," at page 5 without any support for the modification.

<sup>12</sup> See the Fujii patent, for example, at column 4, lines 9-29.

<sup>13</sup> See the Office Action at page 6, first partial paragraph.

record,” and by “clear and particular evidence” of a suggestion, teaching, or motivation to combine the teachings of different references. As discussed above, there is no substantial evidence, nor clear and particular evidence, within the record of motivation for modifying the Kalliojarvi system with APA by incorporating Fujii’s cell re-use partition. Without such motivation and absent improper hindsight reconstruction,<sup>14</sup> a person of ordinary skill in the art would not be motivated to perform the proposed modification, and all pending claims are believed to be non-obvious and patentable over the applied prior art.

Lastly, regarding the rejection of Claims 6, 7, 9, 19, 20, 22, 32, 33 and 35 under 35 U.S.C. §103(a) Applicants traverse these rejections in light of the arguments above and further traverse all instances of the Examiner's Official Notice. Applicants respectfully request that the Examiner provide additional proof to support all instances of the Official Notice.

Consequently, in view of the present Amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for allowance. A Notice of Allowance for claims 1-39 is earnestly solicited.

### **CONCLUSION**

In view of above remarks, reconsideration of the outstanding rejection and allowance of pending claims 1-39 is respectfully requested.

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<sup>14</sup> See MPEP 2141, stating, as one of the tenets of patent law applying to 35 USC 103, that “[t]he references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention.”




If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone Timothy J. Maier, Reg. No. 51,986, at the number listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Very truly yours,

HARNESS, DICKEY & PIERCE, PLC

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